Space saving structure

MDC2

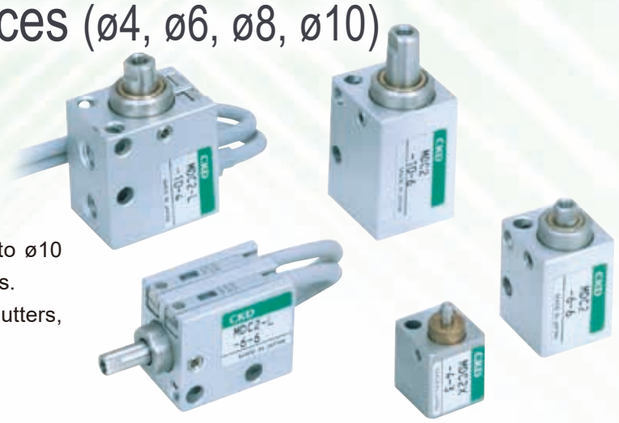
Compact Direct Cylinder

ø4, ø6, ø8, ø10

CONTENTS

MDC2 Series

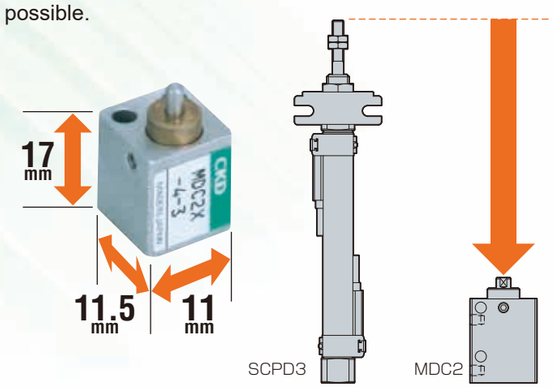
Ultra-compact cylinder capable of direct mounting on 4 surfaces (ø4, ø6, ø8, ø10)



This cylinder has an inner diameter of ø4 to ø10 and can be directly mounted from 4 directions.
Use for workpiece ejection, parts feeder shutters, etc.

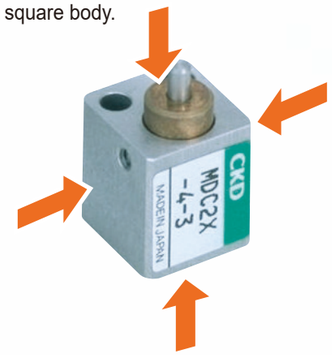
Space-saving design

Overall length and external dimensions shortened as much as possible.



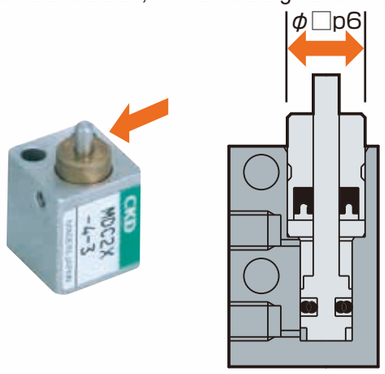
Direct 4-sided mounting

Achieves direct mounting from 4 sides despite its ultra-compact size by adopting a square body.

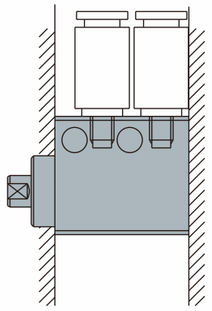


Easy centering

With spigot joint on the rod side, robust bearing structure.



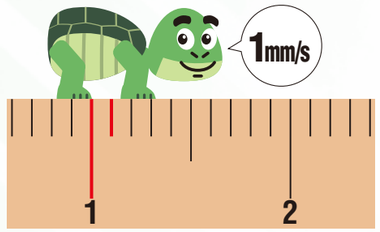
Installation in a narrow, small space and Piping is possible



Ultra-low speed drive from 1 mm/s possible (Low speed type MDC2-F ø6 or more)

Ultra-low speed drive up to 1 mm/s possible

No stick-slip, stable operation even at fine speeds.
Ideal for conveying and positioning delicate products.

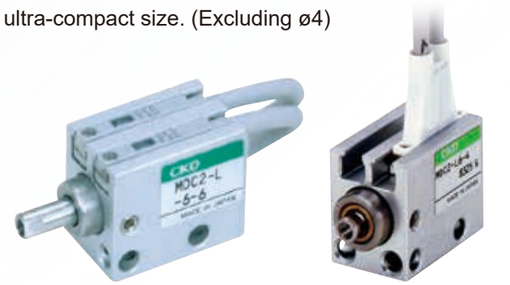


Our company's original sliding mechanism

- Special treatment of the inner surface of the tube.
- Special treatment of the packing surface and optimization of hardness.
- Optimal grease adopted.

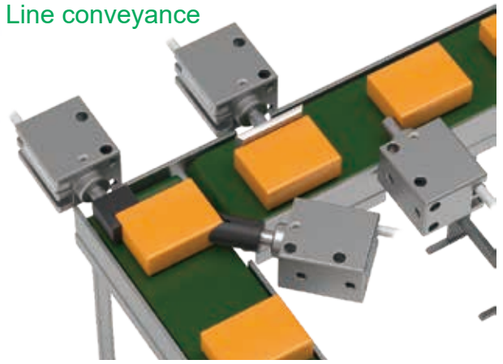
Switch mountable despite ultra-compact size

Cylinder switch can be neatly mounted despite its ultra-compact size. (Excluding ø4)



Application Example

Line conveyance



Abundant variations

Double-acting, single-acting, and ultra low speed types can be selected according to the application.

Model variations		Tube I.D.	Standard stroke (mm) 3	4	6	8	10	Switch
Double acting/ single rod With Switch	MDC2 MDC2-L	ø4	●		●			●
		ø6/ø8		●	●	●		●
		ø10		●	●		●	●
Single Acting, Push Type With Switch	MDC2-X MDC2-XL	ø4	●		●			●
		ø6/ø8		●	●	●		●
		ø10		●	●		●	●
Single acting/pull With Switch	MDC2-Y MDC2-YL	ø4	●		●			●
		ø6/ø8		●	●	●		●
		ø10		●	●		●	●
Double acting/ fine speed With Switch	MDC2-F MDC2-LF	ø6/ø8		●	●	●		●
		ø10		●	●		●	●

Compact Direct Cylinder MDC2 Series

●: Standard, ◎: Option, : Not manufacturable

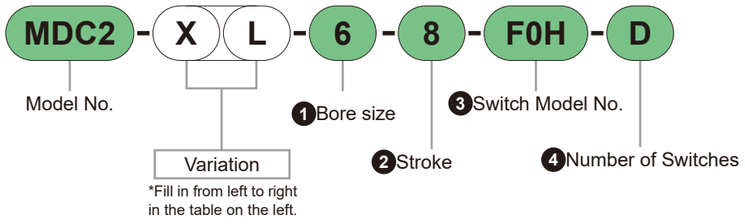
Variation	Model No. / Circuit Diagram / Symbol	Bore size (mm)	Standard Stroke (mm) 3	4	6	8	10	Min. Stroke (mm)	Maximum Stroke (mm)	Switch	Page
Double Acting, Single Rod Type with Switch	MDC2 MDC2-L	ø4	●		●			3	6		718
		ø6		●	●	●		4	8	◎	
		ø8		●	●	●				◎	
		ø10		●	●		●		10	◎	
Single Acting, Push Type with Switch	MDC2-X MDC2-XL	ø4	●		●			3	6		726
		ø6		●	●	●		4	8	◎	
		ø8		●	●	●				◎	
		ø10		●	●		●		10	◎	
Single Acting, Retracting Type with Switch	MDC2-Y MDC2-YL	ø4	●		●			3	6		726
		ø6		●	●	●		4	8	◎	
		ø8		●	●	●				◎	
		ø10		●	●		●		10	◎	
Double Acting, Creep Speed Type with Switch	MDC2-F MDC2-LF	ø6		●	●	●		4	8	◎	738
		ø8		●	●	●				◎	
		ø10		●	●		●		10	◎	

Combination Availability Table for Variations and Option Items

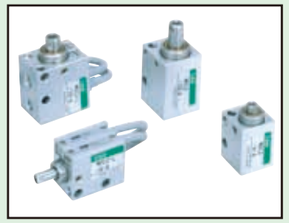
◎Mark: Option
○Mark: Custom Products
△Mark: Manufacturable depending on conditions (Please consult)
×Mark: Not manufacturable

Category		Category	Variation: Double Acting/Single Rod Type	Single Acting, Push Type	Single Acting, Retracting Type	With Cylinder Switch	Low speed type
		Code	None	X	Y	L	F
Variation	Double Acting/Single Rod Type	Blank					
	Single Acting, Push Type	X			×	◎	×
	Single Acting, Retracting Type	Y				◎	×
	With Cylinder Switch	L					◎
	Low speed type	F					
Accessories	Cylinder Switch	Separately Shown	◎	◎	◎	◎	◎

[Model Number Notation Example]



Model No.: Compact Direct Cylinder
● Variation Single Acting/Push Type/With Switch
1 Bore size: ø6 mm
2 Stroke: 8 mm
3 Switch Model No. Reed FO switch, lead wire 1 m
4 Number of Switches: With 2 pcs.

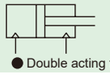


Compact Direct Cylinder Double Acting, Single Rod Type

MDC2 Series

● Tube bore: ø4, ø6, ø8, ø10

Circuit Diagram Symbol



RoHS

Model No. Notation Method

Without Switch
(Without magnet for switch)

MDC2 - 6 - 4
(1) (2) (3)

With Switch
(Built-in magnet for switch)

MDC2-L - 6 - 4 - F2V - R

(1) Model No. (2) Bore size (3) Stroke (4) Switch Model No. (5) Number of Switches

(1) Model No.

Code	Content
MDC2	Double acting, Single rod
MDC2-L	Double acting, Single rod, With switch (ø6 to ø10)

(2) Bore Size (mm)

Code	Content
4	ø4
6	ø6
8	ø8
10	ø10

(3) Stroke (mm)

Stroke	Applicable Tube I.D.			
	ø4	ø6	ø8	ø10
3	●			
4		●	●	●
6	●	●	●	●
8		●	●	
10				●

Note: Refer to page 720 for the min. stroke with switch.

(4) Switch Model No.

For switch details, please refer to P. 869. Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1		
			AC	DC	AC	DC	Straight	L-shape	
Solid State	1-Color	2-wire	-	10 to 30	-	5 to 20	-	F2S□	
		3-wire (NPN)	-	30 or less	-	50 or less	-	F3S□	
		2-wire	-	10 to 30	-	5 to 20 *2	F2H□	F2V□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3H□	F3V□	
		3-wire (PNP)	-	30 or less	-	50 or less	F3PH□	F3PV□	
	2-Color	2-wire	-	24±10%	-	5 to 20	F2YH□	F2YV□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3YH□	F3YV□	
Reed	1-Color	2-wire type	-	24 ± 10%	-	5 to 20	F0H□	F0V□	

*1: For "□" in the switch model number, enter the code selected from the "*Lead wire length" table.
*2: The maximum load current value above, 20 mA, is at 25°C. If the switch operating ambient temperature is higher than 25°C, it will be lower than 20 mA. (At 60°C, it will be 5 to 10 mA.)
*3: Switches other than the model numbers listed above are also available. (Custom products) For details, refer to P. 869.

***Lead wire length**

Code	Content
Blank	1 m (Standard)
3	3 m (Option)

Example) Lead wire length
1 m F0H
3 m F0H 3

(5) Number of Switches

Code	Content
R	With 1 pc on rod side
H	With 1 pc on head side
D	With 2 pcs

Clean Specification (Catalog No. CB-033SAA)

● Dust generation prevention structure usable in cleanrooms

MDC2 - ···· - P7□

MDC2 - ···· - P5□

Rechargeable Battery Compatible Specification (Catalog No. CC-1226AA)

● Structure usable in secondary battery manufacturing processes

MDC2 - ····- P4□

*Please contact us for details.

High Durability Components HP Series (Catalog No. CC-1421AA)

● Long-life actuator that can contribute to productivity improvement with stable operation

MDC2 - ····- HP□

About Custom Product Specifications

Code	Content
Rod End Shape Modification	Refer to Ending 11.

Switch Single Unit Model No. Display Method

SW - F0H
(4) Switch Model No.

Specifications

Item	MDC2 MDC2-L (with switch)			
Bore size mm	ø4 *1	ø6	ø8	ø10
Actuation method	Double Acting Type			
Operating Fluid	Compressed Air			
Maximum operating pressure MPa	0.7			
Min. Operating Pressure MPa	0.2	0.15		0.1
Proof pressure MPa	1.05			
Ambient Temperature °C	-10 to 60 (however, no freezing) *2			
Port Size	M3			M5
Stroke tolerance mm	+0.5 0			
Operating Piston Speed mm/s	50 to 500			
Cushion	None			
Lubrication	Not required (When lubricating, use turbine oil Class 1 ISO VG32)			
Allowable absorbed energy J	This product cannot absorb the energy generated by an external load included to the cylinder. Use without load or provide a separate shock absorber externally.			

*1: MDC2-L does not have ø4.
*2: When using a non-contact switch, use at 40°C or less.

Stroke

Bore Size (mm)	Standard Stroke (mm)	Minimum stroke with 1 switch (mm)		Minimum stroke with 2 switches (mm)	
		Reed switch	Solid state switch	Reed switch	Solid state switch
ø4	3, 6	–	–	–	–
ø6	4, 6, 8	4	4	6	4 (8)
ø8	4, 6, 8	4	4	8	4 (8)
ø10	4, 6, 10	4	4	6	4 (10)

*1: Only standard strokes can be manufactured.
*2: In the case of F2Y, F3Y, F3P, the minimum stroke is the dimension in parentheses.

Cylinder Weight Table

(Unit: g)

Stroke (mm)	3		4		6		8		10		Weight per switch
Bore Size (mm)	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	
ø4	6.4	–	–	–	7.3	–	–	–	–	–	–
ø6	–	–	11.4	13.1	12.4	14	13.4	15	–	–	10
ø8	–	–	16.1	18.2	17.4	19.5	18.7	20.8	–	–	10
ø10	–	–	21.4	23.3	22.6	24.5	–	–	25	26.9	10

Theoretical Thrust Table

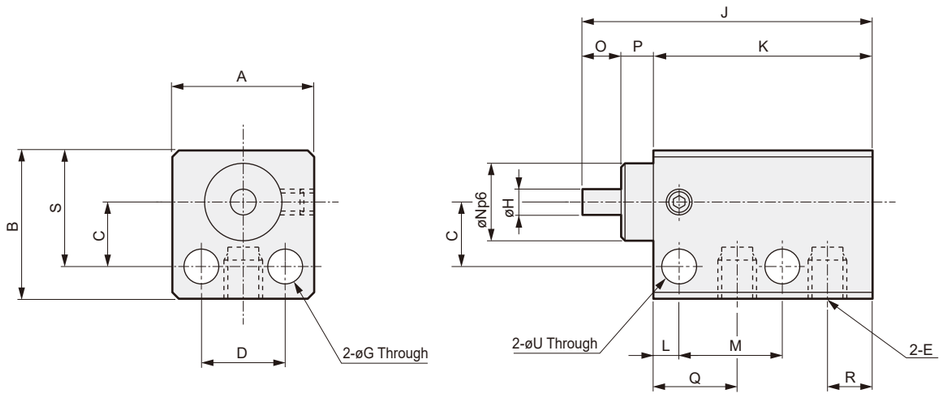
(Unit: N)

Bore size (mm)	Operating Direction	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø4	Push	-	-	2.51	3.77	5.03	6.28	7.54	8.80
	Pull	-	-	1.88	2.83	3.77	4.71	5.65	6.60
ø6	Push	-	4.24	5.65	8.48	11.3	14.1	17.0	19.8
	Pull	-	2.36	3.14	4.71	6.28	7.85	9.42	11.0
ø8	Push	-	7.54	10.1	15.1	20.1	25.1	30.2	35.2
	Pull	-	4.59	6.13	9.19	12.3	15.3	18.4	21.4
ø10	Push	7.85	11.8	15.7	23.6	31.4	39.3	47.1	55.0
	Pull	5.03	7.54	10.1	15.1	20.1	25.1	30.2	35.2

MEMO

Outline Dimension Drawing

●MDC2-4-3,6 (Double acting, Without switch)

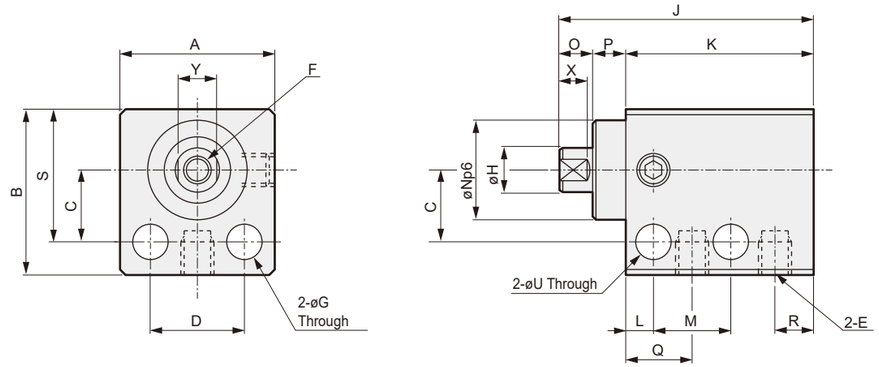


Code / Model No.	A	B	C	D	E	G	H	J	K	L	M	N	O	P	Q	R	S	U
MDC2-4-3	11	11.5	5	6.5	M3	2.7	2	22.5	17	2	8	6	3	2.5	6.5	3.5	9	2.7
MDC2-4-6	11	11.5	5	6.5	M3	2.7	2	25.5	20	2	11	6	3	2.5	6.5	3.5	9	2.7

Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

Outline Dimension Drawing

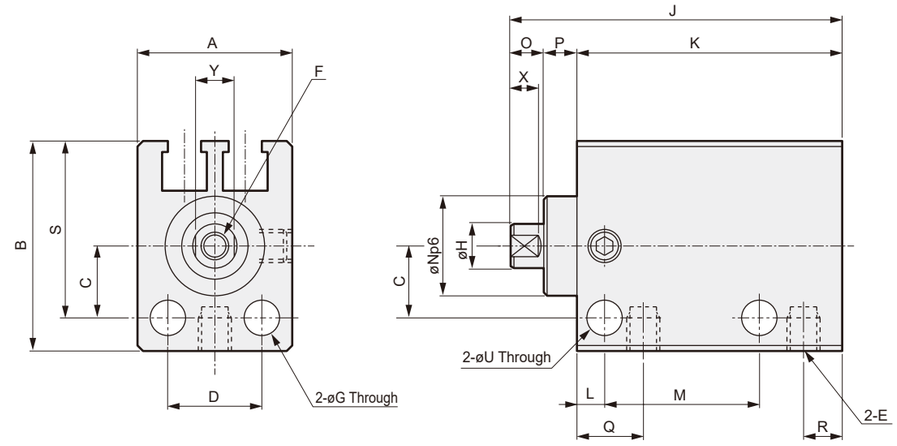
●MDC2-6,8,10 (Double acting, Without switch)



Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-6	4	14	15	6.5	8.5	M3	M2.5×0.45 Depth 4	3.2	4	23	17	2.5	7.5	9	3	3	6	3.5	12	3.2	2.5	3.5
	6									25	19		9									
	8									27	21		11									
MDC2-8	4	16	17	7.5	10	M3	M3×0.5 Depth 5	3.2	5	23	17	2.5	7.5	11	3	3	6	3.5	14	3.2	2.5	4.5
	6									25	19		9									
	8									27	21		11									
MDC2-10	4	16	17.5	8	10	M5	M3×0.5 Depth 5	3.2	6	28	22	2.5	9.5	11	3	3	7	5	14.5	3.2	2.5	5
	6									30	24		11.5									
	10									34	28		15.5									

Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

●MDC2-L-6,8,10 (Double acting, With switch)

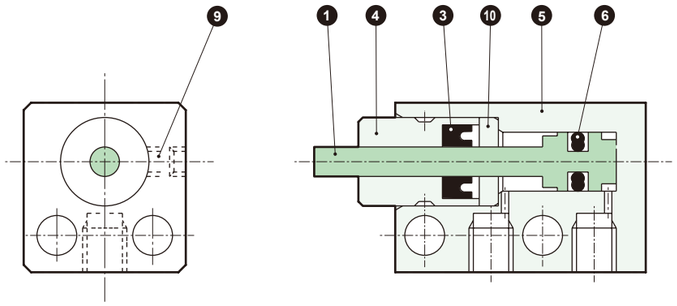


Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-L-6	4	14	19	6.5	8.5	M3	M2.5×0.45 Depth 4	3.2	4	28	22	2.5	12.5	9	3	3	6	3.5	16	3.2	2.5	3.5
	6									30	24		14									
	8									32	26		16									
MDC2-L-8	4	16	22	7.5	10	M3	M3×0.5 Depth 5	3.2	5	28	22	2.5	12.5	11	3	3	6	3.5	18.5	3.2	2.5	4.5
	6									30	24		14									
	8									32	26		16									
MDC2-L-10	4	16	22	8	10	M5	M3×0.5 Depth 5	3.2	6	31	25	2.5	12.5	11	3	3	7	5	19	3.2	2.5	5
	6									33	27		14.5									
	10									37	31		18.5									

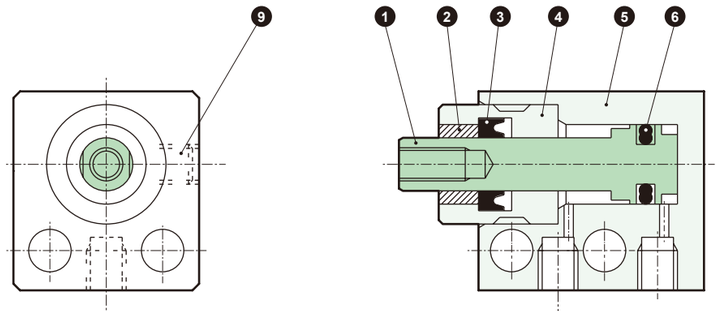
*1: The width and height dimensions of the main body have a plus tolerance. Pay attention to position setting when used in parallel and interference with external parts.
*2: For dimensions of models with switches, see P. 742.

Internal Structure Diagram/Material

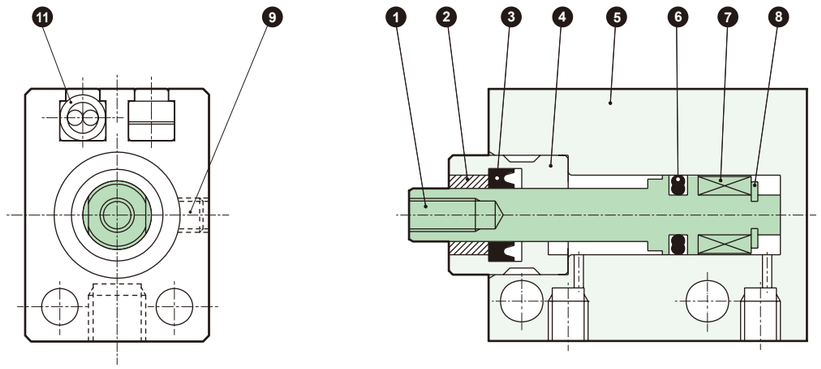
●MDC2-4 (Double acting)



●MDC2-6,8,10 (Double acting)



●MDC2-L-6,8,10 (Double acting, With switch)



Do not disassemble

Part Number	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Piston	Stainless Steel		7	Magnet	Plastic	
2	Bushing	Oil-Impregnated Bearing Alloy		8	E-type retaining ring	Stainless Steel	
3	Rod Packing	Nitrile Rubber		9	Hexagon socket head set screw	Stainless Steel	
4	Rod Metal	ø4: Copper alloy ø6 to ø10: Stainless steel		10	Collar	Stainless Steel	
				With Switch			
5	Cylinder Body	Aluminum Alloy	Hard Anodized	11	Switch		
6	Piston Packing	Nitrile Rubber					

MEMO

Compact Direct Cylinder Single Acting, Push Type; Single Acting, Retracting Type

MDC2-$^{X}_{Y}$ Series

● Tube bore: ø4, ø6, ø8, ø10

Circuit Diagram Symbol

RoHS

Model No. Notation Method

Without Switch
(Without magnet for switch)

MDC2-X - 6 - 4
1 2 3

With Switch
(Built-in magnet for switch)

MDC2-XL - 6 - 4 - F2V - R
1 Model No. 3 Stroke 5 Number of Switches
2 Bore size 4 Switch Model No.

1 Model No.

Code	Content
MDC2-X	Single Acting, Push Type
MDC2-XL	Single acting, Push type, With switch (ø6 to ø10)
MDC2-Y	Single Acting, Retracting Type
MDC2-YL	Single acting, Retracting type, With switch (ø6 to ø10)

2 Bore Size (mm)

Code	Content
4	ø4
6	ø6
8	ø8
10	ø10

3 Stroke (mm)

Stroke	Applicable Tube I.D.			
	ø4	ø6	ø8	ø10
3	●			
4		●	●	●
6	●	●	●	●
8		●	●	
10				●

Note: Refer to P. 728 for the min. stroke with switch.

4 Switch Model No.

For switch details, please refer to P. 869. Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1		
			AC	DC	AC	DC	Straight	L-shape	
Solid State	1-Color	2-wire	-	10 to 30	-	5 to 20	-	F2S□	
		3-wire (NPN)	-	30 or less	-	50 or less	-	F3S□	
		2-wire	-	10 to 30	-	5 to 20 *2	F2H□	F2V□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3H□	F3V□	
		3-wire (PNP)	-	30 or less	-	50 or less	F3PH□	F3PV□	
	2-Color	2-wire	-	24±10%	-	5 to 20	F2YH□	F2YV□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3YH□	F3YV□	
Reed	1-Color	2-wire type	-	24 ± 10%	-	5 to 20	F0H□	F0V□	

*1: For "□" in the switch model number, enter the code selected from the "*Lead wire length" table.
*2: The maximum load current value above, 20 mA, is at 25°C. If the switch operating ambient temperature is higher than 25°C, it will be lower than 20 mA. (At 60°C, it will be 5 to 10 mA.)
*3: Switches other than the model numbers listed above are also available. (Custom products) For details, refer to P. 869.

***Lead wire length**

Code	Content
Blank	1 m (Standard)
3	3 m (Option)

Example) Lead wire length
1 m F0H
3 m F0H 3

5 Number of Switches

Code	Content
R	With 1 pc on rod side
H	With 1 pc on head side
D	With 2 pcs

About Custom Product Specifications

Code	Content
Rod End Shape Modification	Refer to Ending 11.

Switch Single Unit Model No. Display Method

SW - F0H
4 Switch Model No.

Specifications

Item		MDC2-X, MDC2-Y MDC2-XL (with switch), MDC2-YL (with switch)			
Bore size mm		ø4 *1	ø6	ø8	ø10
Actuation method	MDC2-X (L)	Single acting push type			
	MDC2-Y (L)	Single acting retracting type			
Operating Fluid		Compressed Air			
Maximum operating pressure MPa		0.7			
Min. working pressure MPa	MDC2-X (L)	0.35	0.3		0.25
	MDC2-Y (L)	0.4		0.3	0.25
Proof pressure MPa		1.05			
Ambient Temperature °C		-10 to 60 (however, no freezing) *2			
Port Size		M3			M5
Stroke tolerance mm		+0.5 0			
Operating Piston Speed mm/s		50 to 500			
Cushion		None			
Lubrication		Not required (When lubricating, use turbine oil Class 1 ISO VG32)			
Allowable absorbed energy J		This product cannot absorb the energy generated by an external load included to the cylinder. Use without load or provide a separate shock absorber externally.			

*1: MDC2-XL and MDC2-YL do not have ø4.
*2: When using a non-contact switch, use at 40°C or less.

Stroke

Bore Size (mm)	Standard Stroke (mm)	Minimum stroke with 1 switch (mm)		Minimum stroke with 2 switches (mm)	
		Reed switch	Solid state switch	Reed switch	Solid state switch
ø4	3, 6	–	–	–	–
ø6	4, 6, 8	4	4	6	4 (8)
ø8	4, 6, 8	4	4	8	4 (8)
ø10	4, 6, 10	4	4	6	4 (10)

*1: Only standard strokes can be manufactured.
*2: In the case of F2Y, F3Y, F3P, the minimum stroke is the dimension in parentheses.

Cylinder Weight Table

(Unit: g)

Stroke (mm)		3		4		6		8		10		Weight per switch
Bore Size (mm)	Model No.	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	Without Switch	With Switch	
ø4	MDC2-X	4.9	–	–	–	6.9	–	–	–	–	–	–
	MDC2-Y	7.4	–	–	–	9.4	–	–	–	–	–	
ø6	MDC2-X	–	–	10.9	12.6	11.2	14.4	15.1	16.8	–	–	10
	MDC2-Y	–	–	13.3	15	15	16.7	17.5	19.2	–	–	
ø8	MDC2-X	–	–	16	18	18.4	20.5	20.7	22.8	–	–	10
	MDC2-Y	–	–	19	21	21.4	23.5	23.7	25.8	–	–	
ø10	MDC2-X	–	–	19.6	22	22	24.4	–	–	26.9	29.3	10
	MDC2-Y	–	–	21.2	23.4	23.6	25.8	–	–	28.5	30.7	

Spring Load

(Unit: N)

Bore Size (mm)	Stroke (mm)	Spring Load	
		At set	During operation
ø4	3, 6	1.8	2.9
ø6	4, 6, 8	2.3	5.0
ø8	4, 6, 8	4.0	7.0
ø10	4, 6, 10	4.1	7.4

Theoretical Thrust Table

● MDC2-X

(Unit: N)

Bore Size (mm)	Operating Direction	Operating Pressure MPa						
		0.25	0.3	0.35	0.4	0.5	0.6	0.7
ø4	Push	-	-	1.50	2.13	3.38	4.64	5.90
	Pull	-	-	Refer to "Spring Load" in the table above.				
ø6	Push	-	3.48	4.90	6.31	9.1	12.0	14.8
	Pull	-	Refer to "Spring Load" in the table above.					
ø8	Push	-	8.08	10.6	13.1	18.1	23.2	28.2
	Pull	-	Refer to "Spring Load" in the table above.					
ø10	Push	12.2	16.2	20.1	24.0	31.9	39.7	47.6
	Pull	Refer to "Spring Load" in the table above.						

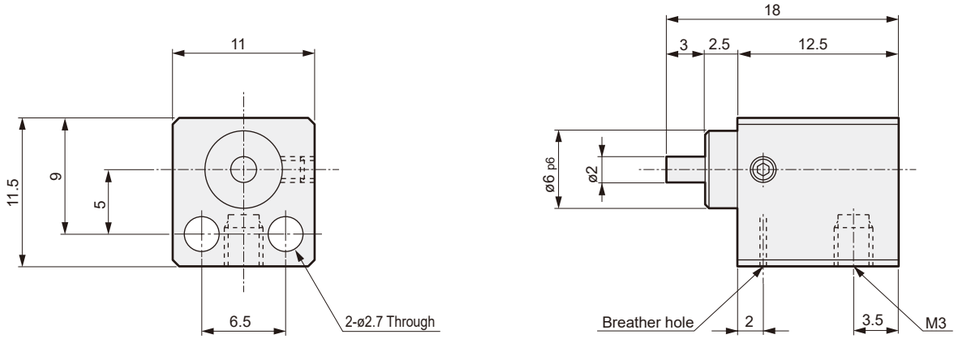
● MDC2-Y

(Unit: N)

Bore Size (mm)	Operating Direction	Operating pressure MPa						
		0.25	0.3	0.35	0.4	0.5	0.6	0.7
ø4	Push	-	-	-	Refer to "Spring Load" in the table above.			
	Pull	-	-	-	0.87	1.81	2.75	3.70
ø6	Push	-	-	-	Refer to "Spring Load" in the table above.			
	Pull	-	-	-	1.28	2.85	4.42	6.0
ø8	Push	-	Refer to "Spring Load" in the table above.					
	Pull	-	2.19	3.72	5.25	8.3	11.4	14.4
ø10	Push	Refer to "Spring Load" in the table above.						
	Pull	5.17	7.68	10.2	12.7	17.7	22.8	27.8

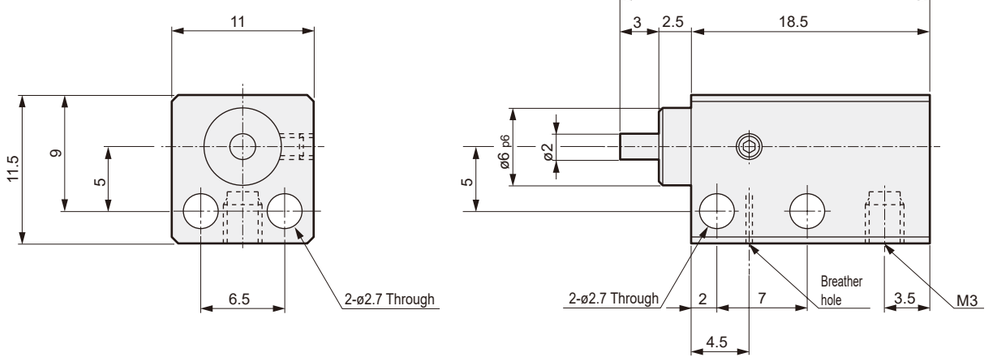
Outline Dimension Drawing

● MDC2-X-4-3 (Single acting, Push type)



Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

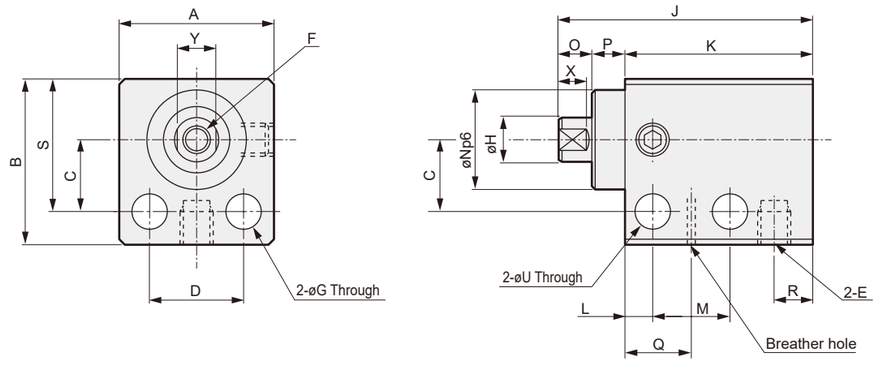
● MDC2-X-4-6 (Single acting, Push type)



Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

Outline Dimension Drawing

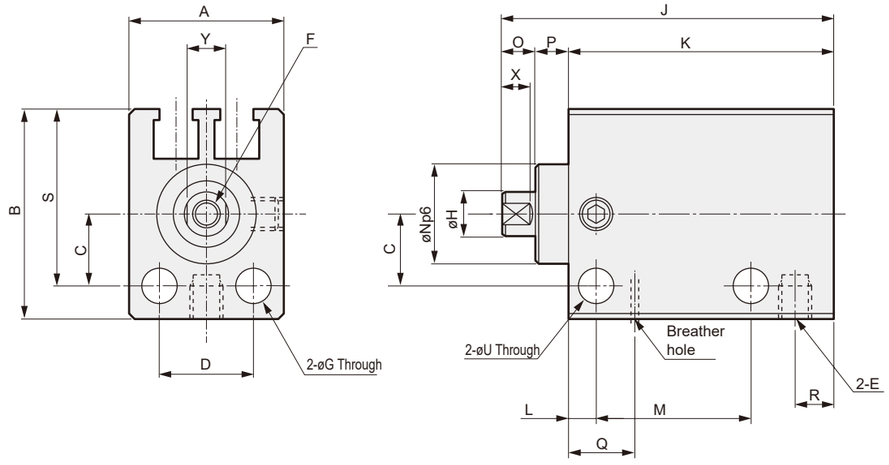
● MDC2-X-6,8,10 (Single acting, Push type, Without switch)



Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-X-6	4	14	15	6.5	8.5	M3	M2.5×0.45 Depth 4	3.2	4	22	16	2.5	6.5	9	3	3	6	3.5	12	3.2	2.5	3.5
	6									25	19		8.5									
	8									29	23		10.5									
MDC2-X-8	4	16	17	7.5	10	M3	M3× 0.5 Depth 5	3.2	5	23	17	2.5	7.5	11	3	3	7	3.5	14	3.2	2.5	4.5
	6									26	20		9									
	8									29	23		11									
MDC2-X-10	4	16	17.5	8	10	M5	M3× 0.5 Depth 5	3.2	6	26	20	2.5	7.5	11	3	3	7.5	5	14.5	3.2	2.5	5
	6									29	23		9.5									
	10									35	29		13.5									

Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

● MDC2-XL-6,8,10 (Single acting, Push type, With switch)

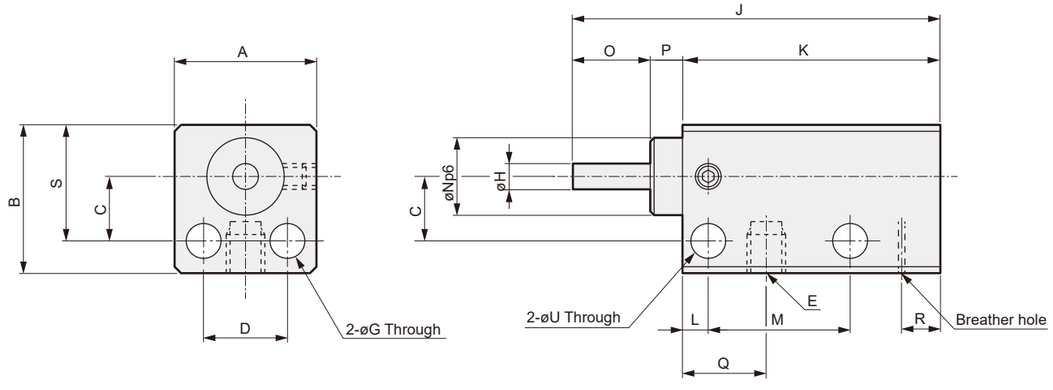


Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-XL-6	4	14	19	6.5	8.5	M3	M2.5×0.45 Depth 4	3.2	4	27	21	2.5	11.5	9	3	3	6	3.5	16	3.2	2.5	3.5
	6									30	24		13.5									
	8									34	28		15.5									
MDC2-XL-8	4	16	22	7.5	10	M3	M3× 0.5 Depth 5	3.2	5	28	22	2.5	12.5	11	3	3	7	3.5	18.5	3.2	2.5	4.5
	6									31	25		14									
	8									34	28		16									
MDC2-XL-10	4	16	22	8	10	M5	M3× 0.5 Depth 5	3.2	6	31	25	2.5	12.5	11	3	3	7.5	5	19	3.2	2.5	5
	6									34	28		14.5									
	10									40	34		18.5									

*1: The width and height dimensions of the main body have a plus tolerance. Pay attention to position setting when used in parallel and interference with external parts.
*2: For dimensions of models with switches, see P. 742 and 743.

Outline Dimension Drawing

●MDC2-Y-4-3,6 (Single acting, Retracting type)

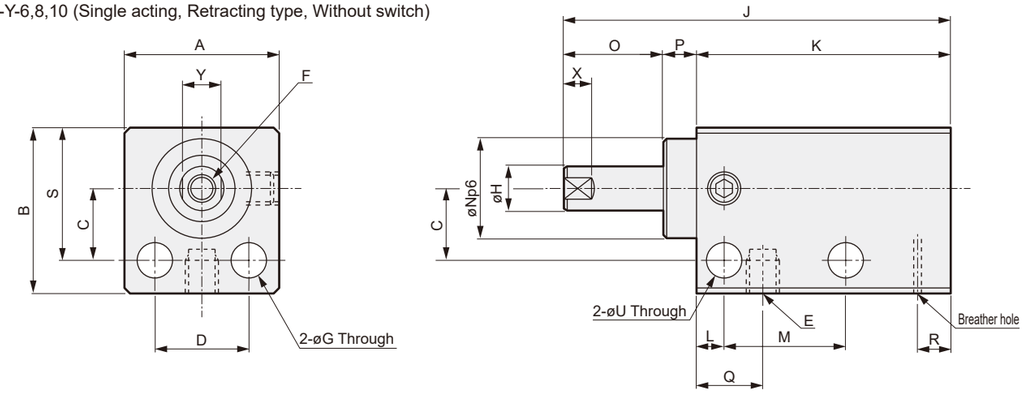


Code / Model No.	A	B	C	D	E	G	H	J	K	L	M	N	O	P	Q	R	S	U
MDC2-Y-4-3	11	11.5	5	6.5	M3	2.7	2	28.5	20	2	11	6	6	2.5	6.5	3.5	9	2.7
MDC2-Y-4-6	11	11.5	5	6.5	M3	2.7	2	37.5	26	2	14	6	9	2.5	6.5	3.5	9	2.7

Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

Outline Dimension Drawing

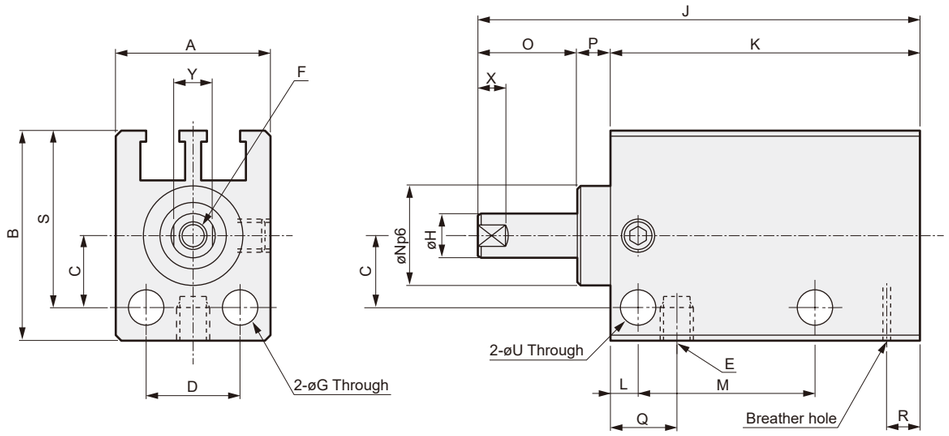
●MDC2-Y-6,8,10 (Single acting, Retracting type, Without switch)



Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-Y-6	4	14	15	6.5	8.5	M3	M2.5× 0.45 Depth 4	3.2	4	30	20	2.5	9	9	7	3	6	3	12	3.2	2.5	3.5
	6									35	23		11		9							
	8									41	27		13		11							
MDC2-Y-8	4	16	17	7.5	10	M3	M3× 0.5 Depth 5	3.2	5	31	21	2.5	9.5	11	7	3	6	3	14	3.2	2.5	4.5
	6									36	24		11.5		9							
	8									41	27		13.5		11							
MDC2-Y-10	4	16	17.5	8	10	M5	M3× 0.5 Depth 5	3.2	6	32	22	2.5	9.5	11	7	3	7	3.5	14.5	3.2	2.5	5
	6									37	25		11.5		9							
	10									47	31		15.5		13							

Note: Width and height dimensions of the body have positive tolerance. Pay attention to position setting when used in parallel and interference with external parts.

●MDC2-YL-6,8,10 (Single acting, Retracting type, With switch)

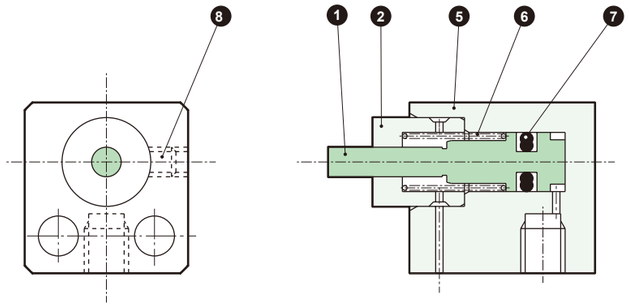


Code / Model No.	Stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	U	X	Y
MDC2-YL-6	4	14	19	6.5	8.5	M3	M2.5× 0.45 Depth 4	3.2	4	35	25	2.5	14	9	7	3	6	3	16	3.2	2.5	3.5
	6									40	28		16		9							
	8									46	32		18		11							
MDC2-YL-8	4	16	22	7.5	10	M3	M3× 0.5 Depth 5	3.2	5	36	26	2.5	14.5	11	7	3	6	3	18.5	3.2	2.5	4.5
	6									41	29		16.5		9							
	8									46	32		18.5		11							
MDC2-YL-10	4	16	22	8	10	M5	M3× 0.5 Depth 5	3.2	6	36	26	2.5	13.5	11	7	3	7	3.5	19	3.2	2.5	5
	6									41	29		15.5		9							
	10									51	35		19.5		13							

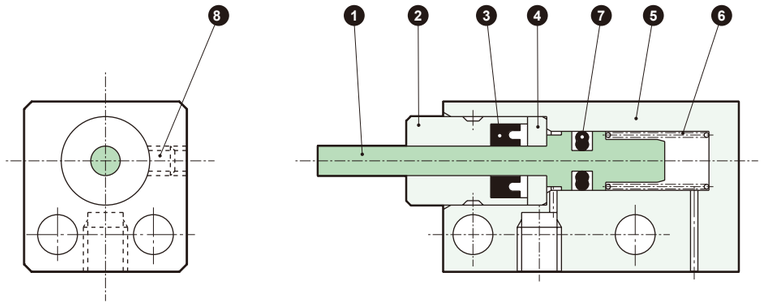
*1: The width and height dimensions of the main body have a plus tolerance. Pay attention to position setting when used in parallel and interference with external parts.
*2: For dimensions of models with switches, see P. 742 and 743.

Internal Structure Diagram/Material

●MDC2-X-4 (Single acting, Push type)



●MDC2-Y-4 (Single acting, Retracting type)

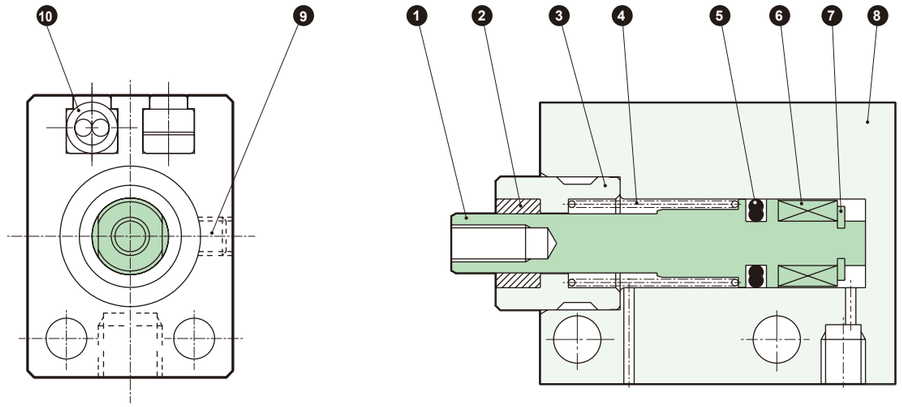


Do not disassemble

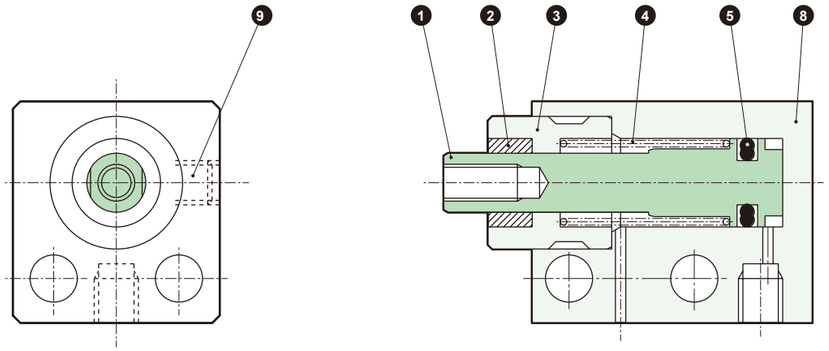
Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Piston	Stainless Steel		5	Cylinder Body	Aluminum Alloy	Hard Anodized
2	Rod Metal	Copper Alloy		6	Coil Spring	Steel	Electrodeposition Coating
3	Rod Packing	Nitrile Rubber		7	Piston Packing	Nitrile Rubber	
4	Collar	Stainless Steel		8	Hexagon socket head set screw	Stainless Steel	

Internal Structure Diagram/Material

●MDC2-XL-6, 8, 10 (Single acting, Push type, With switch)



●MDC2-X-6, 8, 10 (Single acting, Push type)

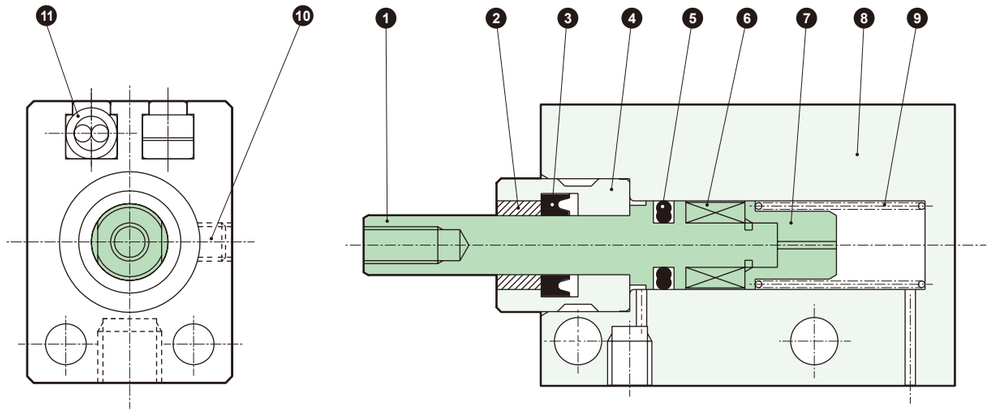


Do not disassemble

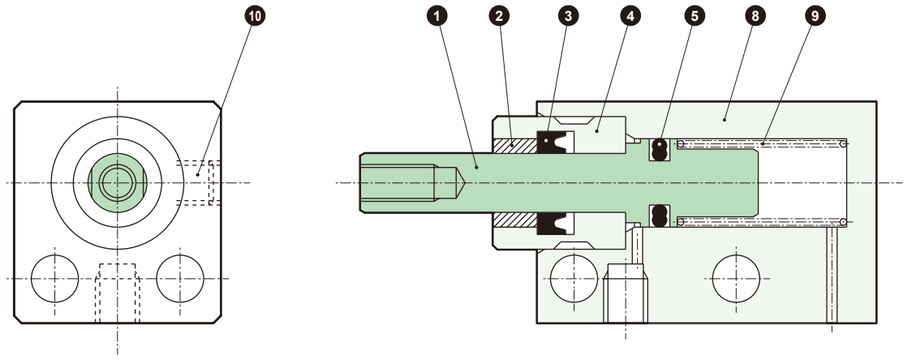
Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Piston	Stainless Steel		7	E-type retaining ring	Stainless Steel	
2	Bushing	Oil-Impregnated Bearing Alloy		8	Cylinder Body	Aluminum Alloy	Hard Anodized
3	Rod Metal	Stainless Steel		9	Hexagon socket head set screw	Stainless Steel	
4	Coil Spring	Steel	Electrodeposition Coating	With Switch			
5	Piston Packing	Nitrile Rubber		10	Switch		
6	Magnet	Plastic					

Internal Structure Diagram/Material

●MDC2-YL-6, 8, 10 (Single acting, Retracting type, With switch)



●MDC2-Y-6, 8, 10 (Single acting, Retracting type)



Do not disassemble

Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Piston	Stainless Steel		7	Spring Retainer	Stainless Steel	
2	Bushing	Oil-Impregnated Bearing Alloy		8	Cylinder Body	Aluminum Alloy	Hard Anodized
3	Rod Packing	Nitrile Rubber		9	Coil Spring	Steel	Electrodeposition Coating
4	Rod Metal	Stainless Steel		10	Hexagon socket head set screw	Stainless Steel	
5	Piston Packing	Nitrile Rubber		With Switch			
6	Magnet	Plastic		11	Switch		

MEMO

Space-Saving Type
SSD2
SSG
SSD
CAT
MDC2
SMG
MSD
FC□
Cylinder Switch
Ending

Compact Direct Cylinder Double Acting, Ultra Low Speed Type

MDC2-F Series

● Tube bore ø6, ø8, ø10

Circuit Diagram Symbol

● Double acting type

RoHS

Model No. Notation Method

Without Switch
(Without magnet for switch)

MDC2-F - 6 - 4
- MDC2-F: Model No.
- 6: ❶ Bore size
- 4: ❷ Stroke

With Switch
(Built-in magnet for switch)

MDC2-LF - 6 - 4 - F2V - R
- MDC2-LF: Model No.
- 6: ❶ Bore size
- 4: ❷ Stroke
- F2V: ❸ Switch Model No.
- R: ❹ Number of Switches

❶Bore Size (mm)

Code	Content
6	ø6
8	ø8
10	ø10

❷Stroke (mm)

Stroke	Applicable Tube I.D.		
	ø6	ø8	ø10
4	●	●	●
6	●	●	●
8	●	●	
10			●

Note: Refer to P. 740 for the min. stroke with switch.

❸Switch Model No.

For switch details, please refer to P. 869. Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1		
			AC	DC	AC	DC	Straight	L-shape	
Solid State	1-Color	2-wire	-	10 to 30	-	5 to 20	-	F2S□	
		3-wire (NPN)	-	30 or less	-	50 or less	-	F3S□	
		2-wire	-	10 to 30	-	5 to 20 *2	F2H□	F2V□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3H□	F3V□	
		3-wire (PNP)	-	30 or less	-	50 or less	F3PH□	F3PV□	
	2-Color	2-wire	-	24±10%	-	5 to 20	F2YH□	F2YV□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3YH□	F3YV□	
Reed	1-Color	2-wire type	-	24 ± 10%	-	5 to 20	F0H□	F0V□	

*1: For "□" in the switch model number, enter the code selected from the "*Lead wire length" table.
*2: The maximum load current value above, 20 mA, is at 25°C. If the switch operating ambient temperature is higher than 25°C, it will be lower than 20 mA. (At 60°C, it will be 5 to 10 mA.)
*3: Switches other than the model numbers listed above are also available. (Custom products) For details, refer to P. 869.

***Lead wire length**

Code	Content
Blank	1 m (Standard)
3	3 m (Option)

Example) Lead wire length
1 m F0H
3 m F0H 3

❹Number of Switches

Code	Content
R	With 1 pc on rod side
H	With 1 pc on head side
D	With 2 pcs

Clean Specification (Catalog No. CB-033SAA)

● Dust generation prevention structure usable in cleanrooms

MDC2-F - · · · · - P7□

Switch Single Unit Model No. Display Method

SW - F0H
- F0H: ❸ Switch Model No.

Specifications

Item	MDC2-F/MDC2-LF (with switch)		
Bore size mm	ø6	ø8	ø10
Actuation method	Double Acting Type		
Operating Fluid	Compressed Air		
Maximum operating pressure MPa	0.7		
Min. Operating Pressure MPa	0.15		0.1
Proof pressure MPa	1.05		
Ambient Temperature °C	5 to 60 *1		
Port Size	M3		M5
Stroke tolerance mm	+0.5 0		
Operating piston speed mm/s	1 to 200		
Cushion	None		
Lubrication	Lubrication Not Possible		
Allowable Absorbed Energy J	This product cannot absorb the energy generated by an external load included to the cylinder. Use without load or provide a separate shock absorber externally.		

*1: When using a non-contact switch, use at 40°C or less.

Stroke

Model No.	Bore size (mm)	Standard Stroke (mm)	Minimum stroke with 1 switch (mm)		Minimum stroke with 2 switches (mm)	
			Reed switch	Solid state switch	Reed switch	Solid state switch
MDC2-F MDC2-LF	ø6	4, 6, 8	4	4	6	4 (8)
	ø8	4, 6, 8	4	4	8	4 (8)
	ø10	4, 6, 10	4	4	6	4 (10)

*1: Only standard strokes can be manufactured.
*2: In the case of F2Y, F3Y, F3P, the minimum stroke is the dimension in parentheses.

Theoretical Thrust Table

(Unit: N)

Bore size (mm)	Operating Direction	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø6	Push	-	4.24	5.65	8.48	11.3	14.1	17.0	19.8
	Pull	-	2.36	3.14	4.71	6.28	7.85	9.42	11.0
ø8	Push	-	7.54	10.1	15.1	20.1	25.1	30.2	35.2
	Pull	-	4.59	6.13	9.19	12.3	15.3	18.4	21.4
ø10	Push	7.85	11.8	15.7	23.6	31.4	39.3	47.1	55.0
	Pull	5.03	7.54	10.1	15.1	20.1	25.1	30.2	35.2

Outline Dimension Drawing

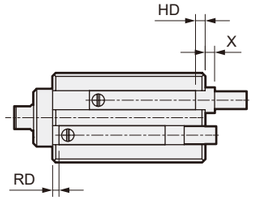
Same as double acting, single rod MDC2 series. See P. 723.

MEMO

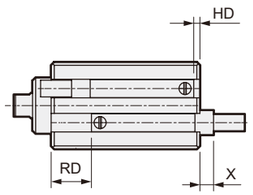
MDC2 Series Outline Dimension Drawing with Switch

●MDC2-L, MDC2-LF, MDC2-X-L, MDC2-Y-L

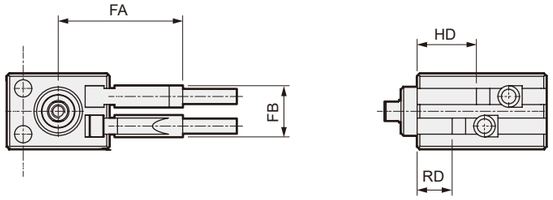
• F0H/V



• F2H/V, F3H/V, F2YH/V, F3YH/V, F3PH/V



• F2S, F3S



Code	MDC2-L, MDC2-LF													
Bore Size (mm)	Stroke	F0			F2, F3			F2Y, F3Y, F3P			F2S, F3S			
		RD	HD	X	RD	HD	X	RD	HD	X	RD	HD	FA	FB
ø6	4	1	-0.5	3.5 / 0.5	6.5	1	4.2 / 1.2	6.5	1	8.7 / 5.7	5.5	9.5	23.1	9.5
	6	1	0	3 / -	6.5	1	2.2 / -	6.5	1	6.7 / 3.7	5.5	11.5		
	8	1	0	3 / -	6.5	1	0.2 / -	6.5	1	4.7 / 1.7	5.5	13.5		
ø8	4	1	-1.5	4.5 / 1.5	6.5	1	4.2 / 1.2	6.5	1	8.7 / 5.7	5.5	9.5	24.6	10
	6	1	0	3 / -	6.5	1	2.2 / -	6.5	1	6.7 / 3.7	5.5	11.5		
	8	1	0	3 / -	6.5	1	0.2 / -	6.5	1	4.7 / 1.7	5.5	13.5		
ø10	4	3.5	0.5	2.5 / -	8	2.5	2.7 / 0.7	8	2.5	7.2 / 4.2	7	11	24.6	10
	6	3.5	0.5	2.5 / -	8	2.5	- / -	8	2.5	5.2 / 2.2	7	13		
	10	3.5	0.5	2.5 / -	8	2.5	- / -	8	2.5	1.2 / -	7	17		

*1: X dimension indicates the protrusion dimension from the end face of the switch body. The upper row shows the X dimension for the straight lead wire type, and the lower row shows the X dimension for the L-shaped lead wire type.
*2: A negative dimension indicates the protrusion dimension from the end face of the main body.
*3: For switch mountability, refer to the model number notation method for each variation.

Code	MDC2-XL													
Bore Size (mm)	Stroke	F0			F2, F3			F2Y, F3Y, F3P			F2S, F3S			
		RD	HD	X	RD	HD	X	RD	HD	X	RD	HD	FA	FB
ø6	4	0	-1	4 / 1	6	0.5	4.7 / 1.7	6	0.5	9.2 / 3.2	5	9	23.1	9.5
	6	1	0	3 / -	7	0.5	2.7 / -	7	0.5	6.2 / 0.2	6	12		
	8	3	0	3 / -	9	0.5	0.7 / -	9	0.5	5.2 / -	8	16		
ø8	4	1	-1.5	4.5 / 1.5	6.5	1	4.2 / 1.2	6.5	1	8.7 / 5.7	5.5	9.5	24.6	10
	6	2	0	3 / -	7.5	1	2.2 / -	7.5	1	6.7 / 3.7	6.5	12.5		
	8	3	0	3 / -	8.5	1	0.2 / -	8.5	1	4.7 / 1.7	7.5	15.5		
ø10	4	4	0	3 / -	8.5	2	3.2 / 0.2	8.5	2	7.7 / 4.7	7.5	11.5	24.6	10
	6	5	0	3 / -	9.5	2	1.2 / -	9.5	2	5.7 / 2.7	8.5	14.5		
	10	7	0	3 / -	11.5	2	- / -	11.5	2	1.7 / -	10.5	20.5		

*1: X dimension indicates the protrusion dimension from the end face of the switch body. The upper row shows the X dimension for the straight lead wire type, and the lower row shows the X dimension for the L-shaped lead wire type.
*2: A negative dimension indicates the protrusion dimension from the end face of the main body.
*3: For switch mountability, refer to the model number notation method for each variation.

MDC2 Series Outline Dimension Drawing with Switch

Code	MDC2-YL													
Bore Size (mm)	Stroke	F0			F2, F3			F2Y, F3Y, F3P			F2S, F3S			
		RD	HD	X	RD	HD	X	RD	HD	X	RD	HD	FA	FB
ø6	4	2.5	1.5	1.5 / -	6.5	4	1.7 / -	6.5	4	5.7 / 3.2	5.5	9.5	23.1	9.5
	6	2.5	2.5	0.5 / -	6.5	5	- / -	6.5	5	2.7 / 0.2	5.5	11.5		
	8	2.5	4.5	- / -	6.5	7	- / -	6.5	7	- / -	5.5	13.5		
ø8	4	2.5	2.5	0.5 / -	6.5	5	0.2 / -	6.5	5	4.7 / 1.7	5.5	9.5	24.6	10
	6	2.5	3.5	- / -	6.5	6	- / -	6.5	6	1.7 / -	5.5	11.5		
	8	2.5	4.5	- / -	6.5	7	- / -	6.5	7	- / -	5.5	13.5		
ø10	4	3.5	1.5	1.5 / -	8	3.5	1.7 / -	8	3.5	6.2 / 3.2	7	11	24.6	10
	6	3.5	2.5	0.5 / -	8	4.5	- / -	8	4.5	3.2 / 0.2	7	13		
	10	3.5	4.5	- / -	8	6.5	- / -	8	6.5	- / -	7	17		

*1: X dimension indicates the protrusion dimension from the end face of the switch body. The upper row shows the X dimension for the straight lead wire type, and the lower row shows the X dimension for the L-shaped lead wire type.
*2: For switch mountability, refer to the model number display method for each variation.

To Use This Product Safely

Be sure to read this before use.
For general cylinder information, see Intro 41, and for cylinder switches, see P. 924.

Individual Precautions: Small direct mounting cylinder MDC2 Series

During Design/Selection

1. Common

Caution

■ When using MDC2 with a contact switch, the cylinder cannot be mounted on a magnetic material (such as an iron plate).

■ Use MDC2 with a non-contact switch at an ambient temperature of 40°C or less. This will cause switch detection failure.

2. Single acting type MDC2-X, Y

Caution

■ Do not leave single-acting cylinders pressurized. If left pressurized, the piston rod may not return by spring force when the pressure is released.

■ A breather hole is provided on the main body, so be careful not to block it during installation.
● This will cause malfunction.

3. Low speed type MDC2-F

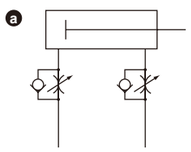
Caution

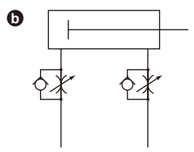
■ Use without lubrication.
● Lubrication may change the characteristics.

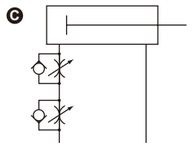
■ Install the speed controller near the cylinder.
● If installed far from the cylinder, the speed will become unstable.
● Use SC-M3/M5-F, SC3W, SCD-M3/M5-F series speed controllers.

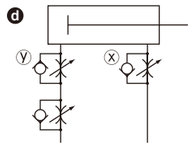
■ Generally, the higher the air pressure and the lower the load factor, the more stable the speed.
● Use with a load factor of 50% or less.

■ Speed control is stable with a meter-out circuit.
● When driving a single rod cylinder at fine speed in the PUSH direction, if the load resistance is small, a lunging phenomenon may occur at the start of operation. As countermeasures, use circuits ⓑ, ⓒ or ⓓ. In addition, the ⓓ circuit is the most stable.





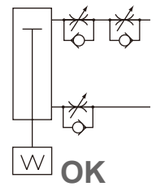


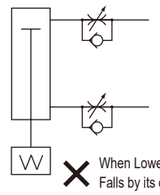


ⓓ Speed adjustment method for PUSH operation of the circuit:
1. Set the speed with the speed controller x.
2. Restrict the speed with the speed controller y until there is no popping out.
3. Reconfirmation of speed

(*1) Comparing ⓑⓒⓓ, the ⓓ circuit offers the most stable operation.

(*2) For vertical mounting, it will fall by its own weight in a meter-in circuit, so combine it with a meter-out circuit.





(*3) For series connection of speed controllers, use the circuit shown in the figure below.

(Guideline for lurching occurrence)
Lurching occurs in the following cases:
• Thrust > Resistance
*Resistance: Thrust due to residual pressure on exhaust side (For creep speed type, intake pressure = residual pressure) + { For horizontal use: Frictional force due to load / For vertical use: Dead weight of the load

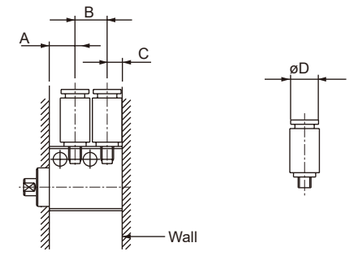
■ Avoid use in locations with vibration.
● Operation becomes unstable due to the influence of vibration.

During Use

1. Common

Caution

■ There are restrictions on the piping fittings that can be used, so please refer to the table below.



Item		Port position dimension (mm)				With wall			Without wall		
I.D. (mm)	Port Size	Stroke	A	B	C	Usable Fittings	Fitting outer diameter øD	Unusable Fittings	Usable Fittings	Fitting outer diameter øD	Unusable Fittings
ø4	M3	3	6.5	7	3.5	GWS3-M3-S FTS4-M3	ø7 or less	GWS4-M3-S SC3W-M3-3 SC3W-M3-4 SC3U-M3-3 SC3U-M3-4	GWS3-M3-S FTS4-M3	ø7 or less	GWS4-M3-S SC3W-M3-3 SC3W-M3-4 SC3U-M3-3 SC3U-M3-4
		6	6.5	10	3.5				GWS3-M3-S GWS4-M3-S FTS4-M3 SC3W-M3-□ SC3U-M3-□	ø10 or less	
ø6	M3	4	6	7.5	3.5	GWS3-M3-S FTS4-M3	ø7 or less	GWS4-M3-S SC3W-M3-3 SC3W-M3-4 SC3U-M3-3 SC3U-M3-4	GWS3-M3-S SC3W-M3-□ SC3U-M3-□	ø7.5 or less	GWS4-M3-S
		6	6	9.5	3.5				GWS3-M3-S GWS4-M3-S FTS4-M3 SC3W-M3-□ SC3U-M3-□	ø9.5 or less	
		8	6	11.5	3.5				↑	ø11.5 or less	
ø8	M3	4	6	7.5	3.5	GWS3-M3-S FTS4-M3	ø7 or less	GWS4-M3-S SC3W-M3-3 SC3W-M3-4 SC3U-M3-3 SC3U-M3-4	GWS3-M3-S SC3W-M3-□ SC3U-M3-□	ø7.5 or less	GWS4-M3-S
		6	6	9.5	3.5				GWS3-M3-S GWS4-M3-S FTS4-M3 SC3W-M3-□ SC3U-M3-□	ø9.5 or less	
		8	6	11.5	3.5				↑	ø11.5 or less	
ø10	M5	4	7	10	5	GWS□-M5-S SC3W-M5-□ SC3U-M5-□ GWS4-M5-S FTS4-M5 FTS6-M5	ø10 or less	GWS□-M5 GWS6-M5-S	GWS□-M5-S SC3W-M5-□ SC3U-M5-□ GWS4-M5-S FTS4-M5 FTS6-M5	ø10 or less	GWS□-M5 GWS6-M5-S
		6	7	12	5				GWS□-M5-S SC3W-M5-□ SC3U-M5-□ GWS4-M5-S GWS6-M5-S GWS4-M5 FTS4-M5 FTS6-M5	ø12 or less	GWS6-M5
		10	7	16	5				GWS□-M5-S SC3W-M5-□ SC3U-M5-□ GWS4-M5-S GWS6-M5-S GWS4-M5 GWS6-M5 FTS4-M5 FTS6-M5	ø14 or less	

*Port position dimensions are for standard models without switches.

■ This cylinder is a non-disassembly type, so do not apply excessive force to the rod metal or cylinder body.

2. Low speed type MDC2-F

⚠ Caution

■ Adjust alignment, etc., so that no lateral load is applied to the cylinder.
Also, adjust and install so that there is no twisting with respect to the sliding guide.

- Fluctuations in load or resistance will make operation unstable.
- Guides with a large difference between static and dynamic friction will have unstable operation.

MEMO

For precautions regarding mounting, installation, adjustment, use, and maintenance, please see "Precautions for Use" in this catalog and the CKD Components Product website (https://www.ckd.co.jp/kiki/en/) -> "Model No." -> Instruction Manual .